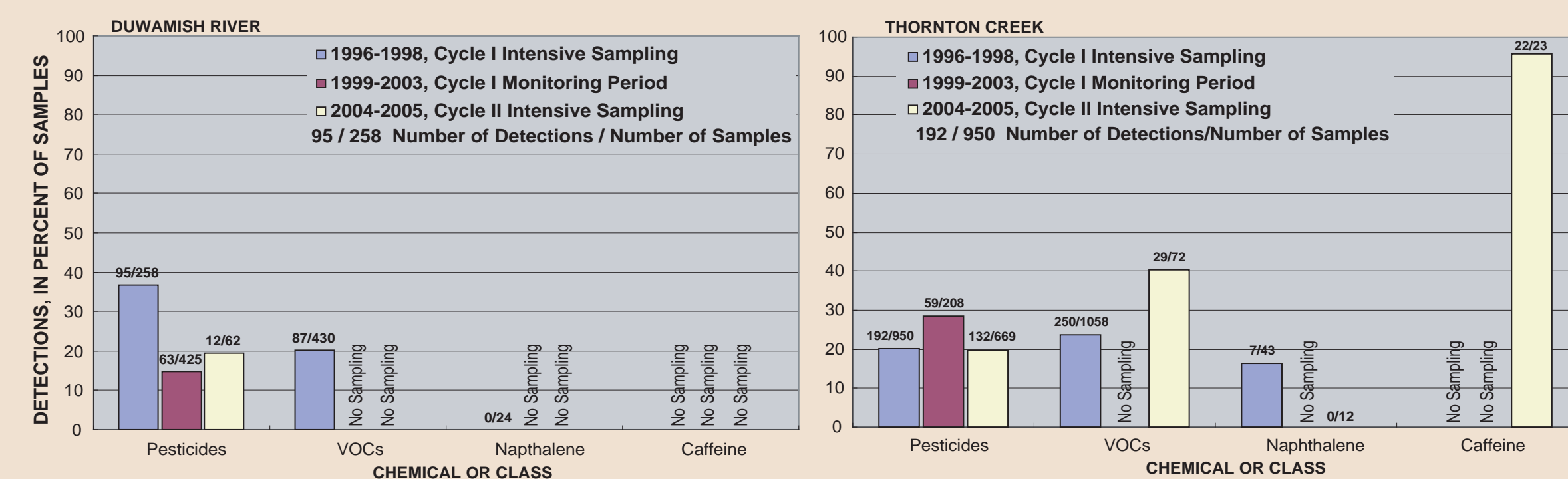
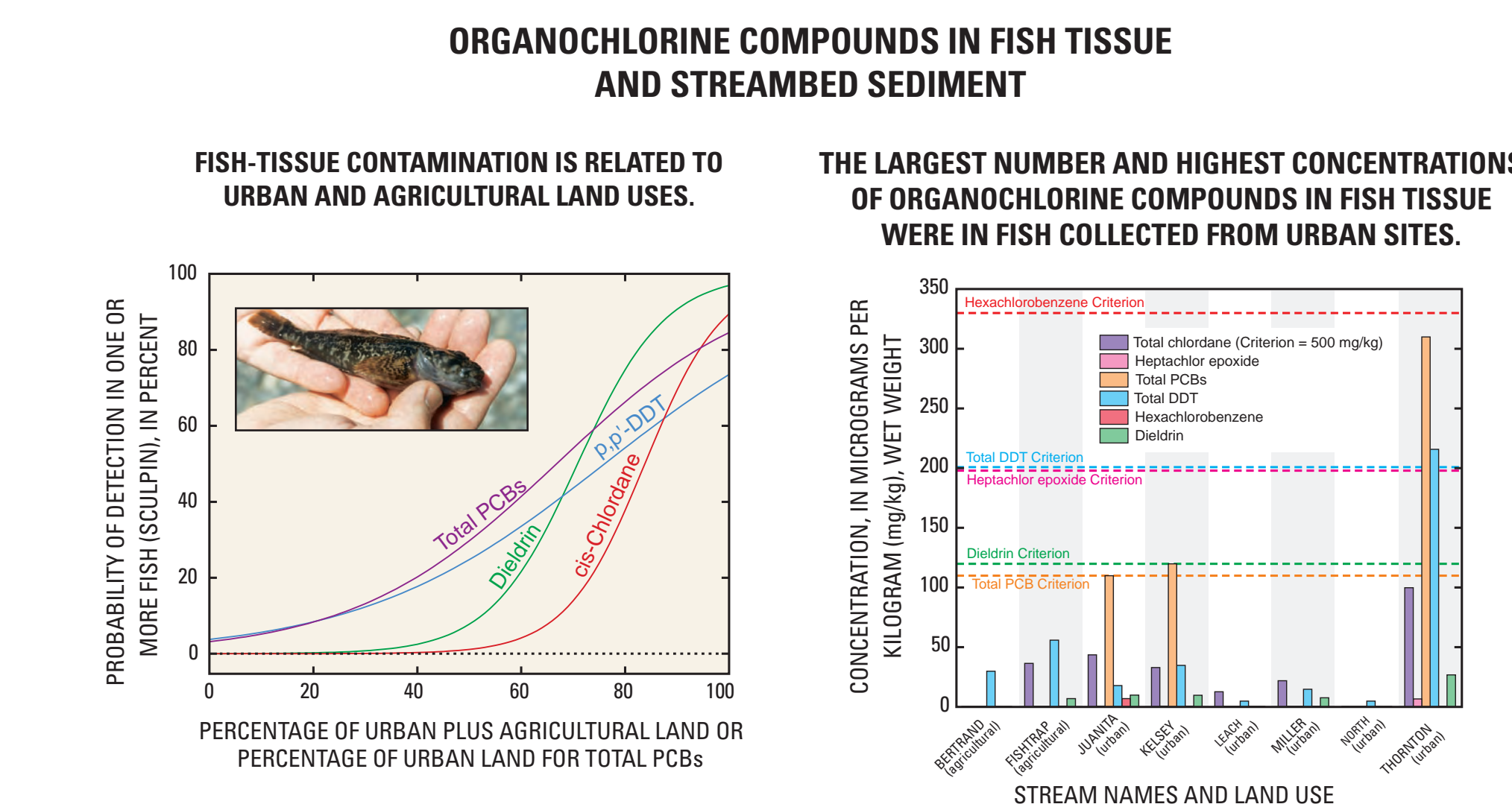
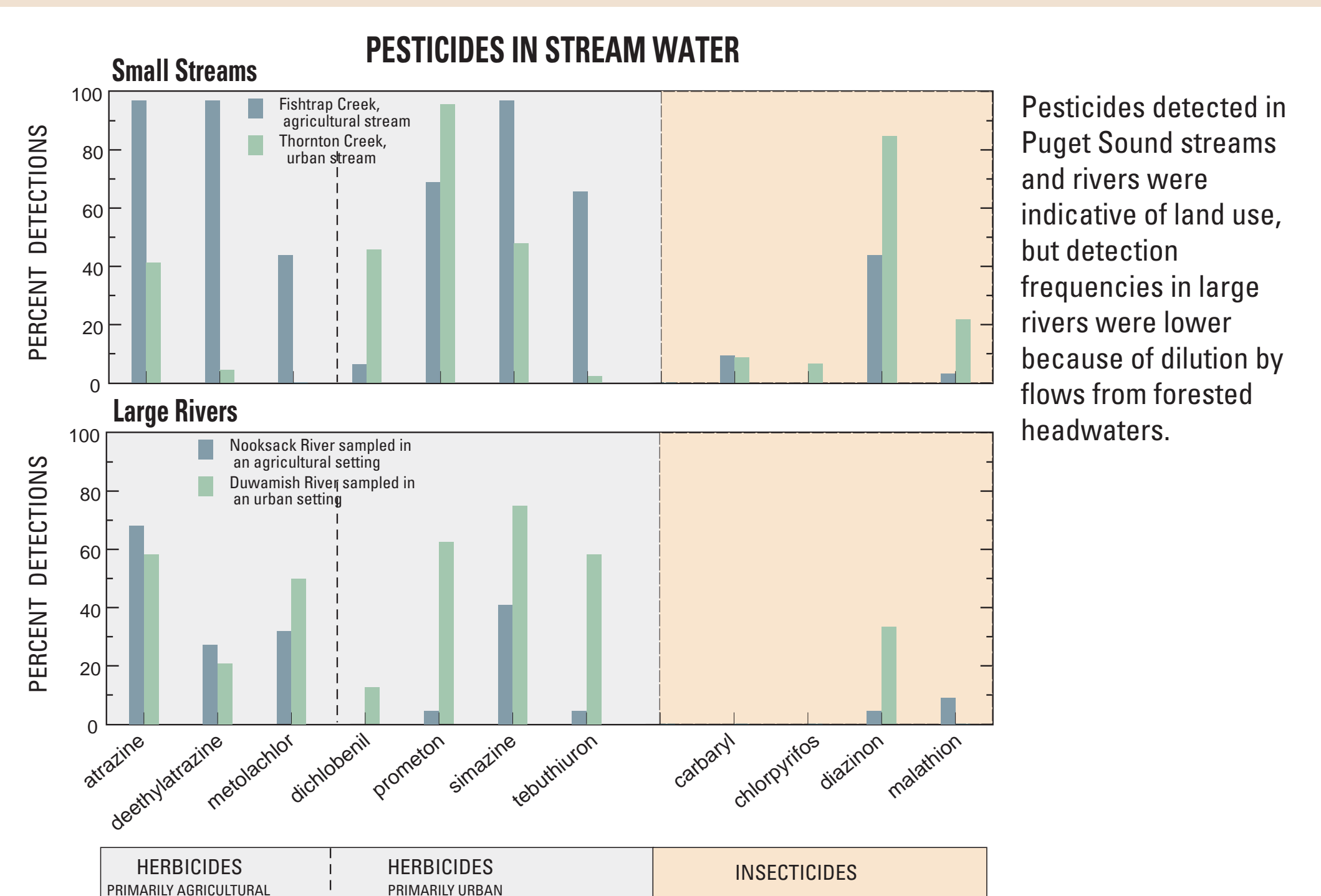


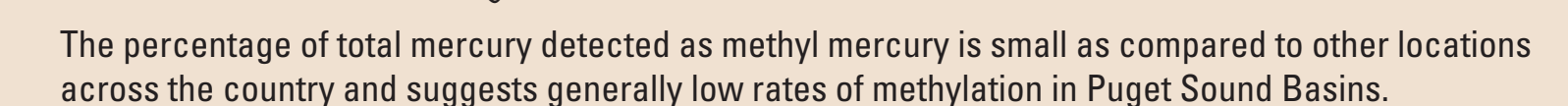
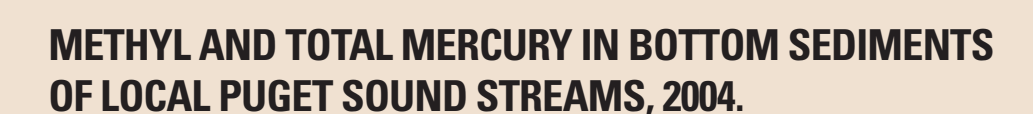
Sandra Embrey and Patrick Moran, Washington Water Science Center, Tacoma, WA

MONITORING YEARS, 1998-2003, AND THE SECOND CYCLE, 2004---

ORGANIC CHEMICALS AND LAND USE



CONCENTRATIONS OF SEVERAL METALS OCCASIONALLY REACHED LEVELS CONSIDERED HARMFUL TO BENTHIC ORGANISMS



Legend:

- Trichloromethane (solid line with square markers)
- Toluene (solid line with diamond markers)
- m,p-xylene (solid line with circle markers)
- Laboratory Reporting Limits
- Open Symbol = No Detect

Date	Trichloromethane (µg/L)	Toluene (µg/L)	m,p-xylene (µg/L)
10/1/94	0.02	0.03	0.05
11/1/94	0.02	0.03	0.05
12/1/94	0.03	0.04	0.05
1/1/95	0.02	0.03	0.05
2/1/95	0.02	0.03	0.05
3/1/95	0.15	0.04	0.03
4/1/95	0.25	0.03	0.03
5/1/95	0.01	0.03	0.01
6/1/95	0.06	0.06	0.06
7/1/95	0.02	0.06	0.06
8/1/95	0.02	0.04	0.06
9/1/95	0.02	0.03	0.06
10/1/95	0.02	0.05	0.06

All 12 samples collected for volatile organic compounds during this second cycle tested positive for trichloromethane (chloroform) and the solvent toluene. Trichloromethane is a byproduct of the chlorination of water supplies, but also is an industrial solvent. The solvent m,p-Xylene was the third most frequently detected VOC.

During the next few years, the Puget Sound Basin study team will be engaged in a focused study to answer the question:

“How do characteristics of stream ecosystems respond to urban land-use changes and how do these responses vary across environmental settings?”

LOCAL OBJECTIVES:

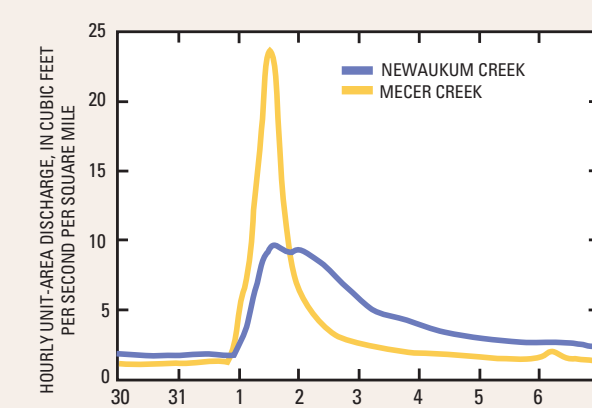
- The links between stream hydrology, chemical quality of streambed sediments, and the health and response of the biological community.
- Particular attention to salmonids and pollutants.

NATIONAL OBJECTIVES:


- Determine hydrologic, geomorphic, chemical, habitat, and biologic characteristics that respond to urban land-use changes.
- Determine key indicators of effects due to urbanization on ecology and biology.
- Determine how physical, chemical, and biological responses vary across environmental settings.
- Develop tools to relate responses to landscape conditions.

TIMELINES

- | | |
|---------|---|
| 2006 | - Planning, site selection, gage installation |
| 2006-08 | - Streamflow, temperature continuous data collection |
| 2007-08 | - Biology, habitat, water, and sediment data collection |
| 2009-11 | - Data analyses and reports |



– STUDY TEAM RESEARCH ELEMENTS

- Effects on stream biology (salmon, invertebrates, algae, and integrated biological processes), including:
 - An understanding of how streambed sediments that are affected by urbanization impact stream biology through changes in chemistry, thickness, hyporheic flow, and spatial distribution of different particle sizes
 - A more sophisticated, integrated measure (index) of urban development
 - A method for establishing response thresholds for the urbanization "factors."
 - New technologies applied to ecological science:
 - Presence and concentrations of pyrethrin/pyrethroids in bottom sediment,
 - GIS analysis of urbanization proximity patterns in relation to streams and developing new metrics to describing these patterns, and
 - Identification of gene activation and protein/enzyme biomarkers through microarray analysis.
- 



FOR ADDITIONAL INFORMATION:

Sandra Embrey - US Geological Survey
Patrick Moran - US Geological Survey

253 428 3600 <http://wa.water.usgs.gov/projects/pugt/>